

bores to prevent the convection of heat. Mr. Lebour, at the request of the Committee, has conducted experiments during the past year on both forms of plug. He reports that:—

"In accordance with Sir W. Thomson's suggestion, discs of india-rubber fixed to the lowering wire above and below the thermometer have been tried. The chief difficulty met with was the unwieldiness of the armed portion of the wire, which could not be wound and unwound from the drum, owing to the fixed disc-holders. This difficulty prevented the placing of the discs anywhere but at the extremity of the wire, whereas it would be very desirable to have a large number of them at intervals along the greater part of its entire length. Discs for a 2½-inch bore were found to work well with a diameter of 2¼ inches. The lowering, and especially the raising, of the wire armed with the disc-plugging were very slow operations, owing to the resistance opposed by the water to the passage of the discs.

Experiments with the form of plug devised by Mr. Lebour himself were continued with a set of better made plugs. "The great disadvantage of this system of plugging is the necessity for using two wires, one to lower the thermometer and plug as usual, and the other to let down weights upon the upper ends of the plugs, when they are to be expanded, and to remove them when they are to be collapsed. This necessitates not only the ordinary drum for the first wire, but also an independent reel for the second. With care, however, and after some practice, the apparatus was found to work well; but it certainly is extremely inconvenient for rapid work, as it requires a good deal of setting up."

Experiments were made with both forms of plug at the depth of 360 feet, in a bore of the total depth of 420 feet. In the one case, eight india-rubber discs were employed, four above and four below the thermometer; in the other, two collapsible plugs, one above and the other below. The experiments had chiefly in view the mechanical difficulties of the subject, and are not decisive as to the sufficiency of the plugs to prevent convection.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

PROPOSED NEW UNIVERSITY.—A movement has for some time been on foot for the establishment of a new university in the north of England, and on Tuesday last week a deputation, which included the Rev. Dr. Gott (Vicar of Leeds), Mr. Edward Baines, Prof. Thorpe, Prof. Rücker, and Mr. R. Reynolds, waited upon the Mayor of Bradford, Mr. B. Priestly, with the object of inducing the Corporation of Bradford to adopt a memorial to the Privy Council in favour of the proposal. The Mayor intimated that the matter would be referred to the Finance and General Purposes Committee of the Corporation for consideration.

FRANCE.—A commission of twenty-two members has been appointed by the Chamber of Deputies of the French Republic, to prepare a general law on primary instruction.

Two new professorships of botany have been created in the faculties of Lille and Rennes.

PARIS.—The medical course at the University is attended at present by 23 ladies, including 12 Russians, 6 English, and 5 French. Since 1865, 30 ladies have studied medicine at Paris, 9 of whom have received the doctor's diploma.

HIGHER FEMALE EDUCATION.—The subject of the admission of female students to the universities is exciting at present an unusual degree of discussion in Germany as well as in England. In this connection we notice the publication of a letter from Prof. G. H. Meyer, of the medical faculty of Zurich, in which he states, as the result of the experience of a number of years with female students, that he can detect no difference in the average amount of talent and application shown by the representatives of the two sexes under his charge. From a social as well as a professional standpoint, the advanced position taken by the University of Zurich in this direction, during the past few years, is shown to be justified.

KÖNIGSBERG.—The university is attended at present by 655 students, including 42 in the theological faculty, 174 in the legal, 134 in the medical, and 305 in the philosophical. But 42 are from outside of Prussia. The corps of instructors numbers 40. The university possesses a library of 155,000 volumes, an observatory, the zoological museum founded by von Baer, and numerous clinics. On February 2 the eminent philosopher, Herr Rosenkranz, celebrated the fiftieth anniversary of his

receiving his doctor-diploma. The German Emperor, the Crown Prince, and all the German Universities, sent congratulatory telegrams and addresses.

HALLE.—On February 27 the 150th anniversary of the establishment of an agricultural chair was celebrated at the Halle University. At the same time the fifteenth anniversary of the opening of the Halle Agricultural Institute, under the direction of its founder, Prof. Kühn, was solemnised. A torchlight procession and banquet were followed by the laying of the foundation-stone for a new geological museum, which is principally destined to contain a geognostical collection of the most important formations in their natural form and succession.

MÜNICH.—The rapid increase in the attendance shows that this young University is taking a leading position in Germany. At present the students number 1,360, an increase of over 200 on 1876-77. The philosophical faculty contains 400, and the medical 340. Countries outside of Bavaria are represented by 346. The corps of instructors number 114.

GIESSEN.—The university is attended at present by 315 students, of whom 237 are natives of Hesse. There are but 16 students of chemistry, a striking contrast to the numbers which were wont to flock from all quarters to Liebig's laboratory.

MARBURG.—The number of students in attendance on the university during the past winter was 415. They were divided among the faculties as follows:—Theology 51, law 85, medicine 100, philosophy 179. The Prussian students numbered 263.

BONN.—The professorship of geology and palæontology in this university has been offered to the well-known geologist, Prof. von Seebach, of Göttingen.

KIEL.—The vacant chair of botany is to be filled by Prof. A. Engler, of Munich.

DRESDEN.—A congress of representatives from all the German technical institutions is to take place at Dresden shortly after Easter.

LEIPZIG.—A young lady has taken here, for the first time, the degree of Doctor of Jurisprudence in the legal faculty.

PRUSSIA.—The number of legal students in the various universities has increased so rapidly of late years that they now form three-tenths of the total number.

GERMANY.—From statistical results published by the *Neue Deutsche Schul Zeitung*, it is shown that 60,000 schools with 6,000,000 pupils are in existence in Germany, for a population of about 40,000,000 inhabitants.

MADRID.—The Royal School of Mines has recently celebrated its 100th anniversary and published a handsome historical work in commemoration of the event.

UPSALA.—The University is attended at present by 1,370 students, consisting of 331 in the theological faculty, 145 in the legal, 181 in the medical, and 713 in the philosophical. The corps of instructors numbers 110, including 30 ordinary and 9 extraordinary professors.

SCIENTIFIC SERIALS

Reale Istituto Lombardo di Scienze e Lettere, Rendiconti, vol. xi., fasc. i. and ii.—On some propositions of Clausius on the theory of potentials, by M. Beltrami.—On the composition of cheeses, and on the emanation of fat from their albuminoid substances during maturation, by MM. Musso and Menozzi.—On determination of the nitrogen in milk and its products, by M. Menozzi.—On the resistance of the helices of telegraphic electro-magnets, by M. Ferrini.—Experimental researches on heterogenesis; on the limit of productivity of organic solutions (third communication), by MM. Maggi and Giovanni.—Chemical manures, the agrarian industry, and funded property, by M. Gaetano.—On a reaction of substances reductive in general, and in particular of glucose, by M. Pollacci.—On granite in the serpentine formation of the Apennines, by M. Torquato.

Morphologisches Jahrbuch, vol. iv. part 1, commences with a paper of 111 pages by Max Fürbringer on the comparative anatomy and development of the excretory organs of vertebrata. Nearly fifty figures are given to illustrate the early stages of these organs in the common frog and salamander, a full *résumé* is given of all observations on those of other vertebrates; together with a discussion on their homologies, and on their indications of relationship to the segmental organs of worms.—A careful description of the anatomy of *Isis neapolitana*, n.sp., is given by

G. von Koch.—Dr. H. von Ihering's contribution to the anatomy of Chiton deals chiefly with the sexual apparatus, the kidney, and the muscles. He shows that in Chitonidae the sexes are undoubtedly separate, and that the ova are fertilised in the ovary.—Observations on the formation, fertilisation, and segmentation of the animal egg, by Oscar Hertwig, part 3, 20 pages, 3 plates. This part deals with the ova of the star-fish, *Asteracanthion*.

Zeitschrift für wissenschaftliche Zoologie, vol. xxx. part 2.—Contribution to the knowledge of the flagellate infusorians and some related organisms, by O. Bütschli, 78 pp. 5 plates, describing or criticising a great number of species.—On the lungs of *Birgus latro* (land crab), by C. Semper.—The copulatory organs of plagiostomes, by K. R. Petri, 48 pp. 3 plates.—The central nervous system of the alligator, by Rahl-Rückard, 38 pp. 2 plates.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, March 28.—“Measurements of Electrical Constants. No. II. On the Specific Inductive Capacities of Certain Dielectrics,” by J. E. H. Gordon, B.A. Camb. First Series. Communicated by Prof. J. Clerk Maxwell, F.R.S. (Abstract.)

The author has, under Prof. Clerk Maxwell's directions, carried out some measurements of specific inductive capacities by a new method.

The author finds that all his results are much lower than those obtained by previous experimenters, and suggests that the fact may perhaps be explained on a supposition that the specific inductive capacity of dielectrics increases from an inferior to a superior limit during the first small fraction of a second after the commencement of the electrification. He discusses this question at some length in his paper.

“On the Thermo-Electric Properties of Liquids,” by G. Gore, LL.D., F.R.S.

In this communication the author has described an improved apparatus for examining the thermo-electric properties of liquids, by the use of which, with the precautions stated, all sources of error in such experiments appear to be removed; he has also described a number of experiments he has made with it, and the results obtained.

By employing a sufficient number and variety of electrically-conducting solutions, of acids, salts, and alkalies, in those experiments, he has discovered several exceptions to the usual effect he had formerly obtained, viz., that acid liquids are thermo-electro-positive, and alkaline ones thermo-electro-negative, and has sketched a diagram representing the thermo-electric behaviour of heated platinum in three of the exceptional liquids.

Reasoning upon the satisfactory results obtained, he concludes:—(1) That the electric currents are not produced by chemical action; (2) Nor by a temporary disassociation of the constituents of the liquid; (3) Nor by the action of gases occluded in the metals; (4) But that they are produced purely and solely by the heat, and that heat disappears in producing them; (5) That they are immediate or direct effects of the heat, and that aqueous conducting liquids, therefore, possess true thermo-electric properties; (6) That the current is a result of a difference of thermic action at the surfaces of the two pieces of metal; (7) That it is a product of a suitable molecular structure of the liquid, a change of such structure resulting from alteration of temperature, and a direct conversion of heat into electricity; and (8) That the circumstance which is most influential in enabling heat to produce the currents, and most determines their direction and amount, is a suitable molecular structure of the liquid.

By means of the apparatus and process described, he has discovered irregular molecular changes in several of the liquids examined; and as molecular changes are the bases of various physical and chemical alterations, he suggests the use of this apparatus and method as a new one for discovering anomalous molecular alterations, and other coincident physical and chemical ones, in electrically conducting liquids; and for detecting differences of electric potential between metals and liquids at different temperatures.

By reasoning upon the different results obtained, he concludes also as probable, that when a piece of metal is simply immersed

in a suitable liquid, a change of temperature occurs; and this (if correct¹) is a parallel fact to that of the production of electricity by simple contact only. The results also support the contact theory of voltaic electricity.

The paper concludes with several suggestions of new lines of research suggested by the experiments, one of which is the construction of a new thermo-electro-motor.

Chemical Society, March 30.—Anniversary meeting.—Dr. Gladstone, president, in the chair.—The following is a brief summary of the president's address:—The bye-laws have been thoroughly revised. Successful efforts have been made to expedite the publication of the *Journal*, and a sub-editor, Mr. C. E. Groves, has been appointed. The Research Fund now amounts to 4,000*l.*, and already two papers have resulted from the assistance rendered by it to investigators. The President hopes that many chemists, especially those to whom the pursuit of chemistry has become a source of wealth, will contribute to this important fund. During the past year an independent body, the Institute of Chemistry of Great Britain and Ireland has been formed and incorporated; its objects, which are quite distinct from those of the Chemical Society, are the encouragement of the study of chemistry and the maintenance of the profession on a sound and satisfactory basis. Sixty-five papers have been read during the past session, and two lectures have been delivered. There are at present 965 Fellows. The Society has lost by death one eminent foreign member, M. Regnault, and, besides, Messrs. R. Apjohn, J. J. Griffin, W. Gossage, T. Hall, E. L. Koch, M. Murphy, Dr. Noad, and E. F. Tschernacher. After several votes of thanks, &c., the following officers were elected for the ensuing year:—President—J. H. Gladstone, Ph.D., F.R.S. Vice-presidents—F. A. Abel, C.B., Sir B. C. Brodie, W. De la Rue, E. Frankland, A. W. Hofmann, W. Odling, Lyon Playfair, A. W. Williamson, T. Andrews, W. Crookes, F. Field, N. S. Maskelyne, H. E. Roscoe, R. Angus Smith. Secretaries—W. H. Perkin and H. E. Armstrong. Foreign Secretary—Hugo Müller. Treasurer—W. J. Russell. Council—Lothian Bell, M. Carteighe, A. H. Church, W. N. Hartley, C. W. Heaton, D. Howard, G. Matthey, E. Riley, W. A. Tilden, R. V. Tuson, R. Warington, C. R. A. Wright. During the meeting it was announced that Mr. Warren De la Rue had presented the Research Fund with the sum of 100*l.* on the condition that it should be devoted to any one important research.

Anthropological Institute, March 12.—Mr. John Evans, D.C.L., F.R.S., president, in the chair.—Prof. A. Graham Bell read a paper on the natural language of the deaf and dumb. The author stated that in most cases dumbness was merely a consequence of deafness, and does not arise from any deficiency in the vocal organs, but merely from the inability to acquire articulate language, from want of means of imitating it. This can be supplied by teaching. The dogma, “without speech, no reason,” is not well founded. Deaf-mute children think in pictures. Thence they form a language of signs which, as contractions of it become understood, develops into a conventional language, but its extent is very limited. No deaf-mute has been found who had formed the idea of a Supreme Being. About the commencement of the present century the Abbé de l'Épée opened an institution for the education of deaf-mutes. The tendency of education was to render the language more and more conventional by means of contractions. Of this Mr. Bell gave many interesting examples. The result of systematic education has been to enable the deaf-mutes to form a community among themselves, using a real language, representing abstract ideas as well as mere objects. Not only so, but the language has idioms of its own; for example, the objective case comes first—thus, “the boots made the bootmaker.” This is a difficulty, and perhaps a mistake in the education; it affords, however, a useful subject for anthropological inquiry into the analogy with the development of spoken language. In illustration, Mr. Bell delivered the Lord's Prayer in the sign language. The North American Indians have a sign language, the same in character, but less developed, than that of the deaf-mutes. The language of the deaf-mutes is beginning to split into dialects.

Photographic Society, March 12.—J. Glaisher, F.R.S., president, in the chair.—Papers were read by Dr. van Monckhoven on the fading of carbon prints, and the suppression of

¹ Since writing the paper he has proved, by experiment, that when a sheet of platinum is immersed in various saline, alkaline, and acid liquids, a slight rise of temperature takes place; the solutions already employed, in which such a result occurs, are enumerated.